1. Subtract the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = 4x^3 + x^2 + 5x + 3 \text{ and } g(x) = \frac{4}{6x + 19}$$

A. The domain is all Real numbers except $x = a$, where $a \in [-3.17, 2.83]$

B. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-10.2, -0.2]$

C. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-13.5, -6.5]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-6.6, -5.6]$ and $b \in [-7.33, -3.33]$

E. The domain is all Real numbers.

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2. Choose the interval below that f composed with g at $x = -1$ is in.

$$f(x) = 2x^3 - 3x^2 - 4x - 1 \text{ and } g(x) = 3x^3 - 1x^2 - 3x + 3$$

A. $(f \circ g)(-1) \in [-9, -3]$

B. $(f \circ g)(-1) \in [0, 4]$

C. $(f \circ g)(-1) \in [-21, -12]$

D. $(f \circ g)(-1) \in [-29, -26]$

E. It is not possible to compose the two functions.

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3. Choose the interval below that f composed with g at $x = 1$ is in.

$$f(x) = 4x^3 - 1x^2 - 2x \text{ and } g(x) = x^3 + x^2 - x + 2$$

A. $(f \circ g)(1) \in [88, 97]$

B. $(f \circ g)(1) \in [-5, -4]$

C. $(f \circ g)(1) \in [2, 6]$

D. $(f \circ g)(1) \in [100, 103]$

E. It is not possible to compose the two functions.

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4. Find the inverse of the function below. Then, evaluate the inverse at $x = 8$ and choose the interval that $f^-1(8)$ belongs to.

$$f(x) = e^{x-4} - 4$$

A. $f^{-1}(8) \in [-4.61, -1.61]$

B. $f^{-1}(8) \in [-1.52, -0.52]$

C. $f^{-1}(8) \in [1.48, 11.48]$

D. $f^{-1}(8) \in [-4.61, -1.61]$

E. $f^{-1}(8) \in [-1.52, -0.52]$

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5. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -13$ and choose the interval that $f^-1(-13)$ belongs to.

$$f(x) = 4x^2 - 3$$

A. $f^{-1}(-13) \in [2.52, 3.29]$

B. $f^{-1}(-13) \in [3.81, 4.71]$

C. $f^{-1}(-13) \in [1.81, 2.5]$

D. $f^{-1}(-13) \in [1.15, 1.95]$

E. The function is not invertible for all Real numbers.

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6. Find the inverse of the function below. Then, evaluate the inverse at $x = 9$ and choose the interval that $f^-1(9)$ belongs to.

$$f(x) = e^{x+5} - 2$$

A. $f^{-1}(9) \in [-0.77, -0.59]$

B. $f^{-1}(9) \in [7.29, 7.8]$

C. $f^{-1}(9) \in [0.07, 0.74]$

D. $f^{-1}(9) \in [-0.08, 0.22]$

E. $f^{-1}(9) \in [-2.69, -2.51]$

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7. Determine whether the function below is 1-1.

$$f(x) = 9x^2 - 60x + 100$$

A. Yes, the function is 1-1.

B. No, because the range of the function is not $(-\infty, \infty)$.

C. No, because the domain of the function is not $(-\infty, \infty)$.

D. No, because there is an x-value that goes to 2 different y-values.

E. No, because there is a y-value that goes to 2 different x-values.

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8. Determine whether the function below is 1-1.

$$f(x) = (3x - 18)^3$$

A. No, because there is an x-value that goes to 2 different y-values.

B. Yes, the function is 1-1.

C. No, because there is a y-value that goes to 2 different x-values.

D. No, because the range of the function is not $(-\infty, \infty)$.

E. No, because the domain of the function is not $(-\infty, \infty)$.

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9. Multiply the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = \frac{2}{3x - 13} \text{ and } g(x) = \frac{2}{3x - 19}$$

A. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-4.17, -2.17]$

B. The domain is all Real numbers except $x = a$, where $a \in [-8.8, -1.8]$

C. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [3.33, 10.33]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [2.33, 8.33]$ and $b \in [4.33, 10.33]$

E. The domain is all Real numbers.

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10. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -12$ and choose the interval that $f^-1(-12)$ belongs to.

$$f(x) = 4x^2 - 3$$

A. $f^{-1}(-12) \in [1.56, 2.12]$

B. $f^{-1}(-12) \in [4.48, 4.58]$

C. $f^{-1}(-12) \in [7.34, 7.65]$

D. $f^{-1}(-12) \in [1.37, 1.68]$

E. The function is not invertible for all Real numbers.
